REMARKS

Claims 1-24 are pending. Claims 1-24 are rejected.

Claim Rejections – 35 USC § 103

Claims 1-21 have been rejected under 35 USC 103(a) as being unpatentable over US Pat. 7,138,437 to Giorgini et al. ("Giorgini"), in view of US Pat. 4,295,259 to Rhodes et al. ("Rhodes") as evidenced by US Pat. 5,173,222 to Young et al. ("Young") in further view of US Pat. 4,275,172 to Barth et al. ("Barth") or US Pat. 5,166,303 to Markusch et al. ("Markusch1) or US Pat. 5,607,998 to Markusch et al. ("Markusch2) or US Pat. 6,786,680 to Markusch et al. ("Markusch3).

Applicants traverse the above rejection based on Giorgini, Rhodes and Young for the reasons set forth in prior responses and for the reasons set forth below. Applicants traverse the above rejection based on Barth and Markusch 1-3 for the reasons set forth below.

Applicants have previously provided Declarations Traversing Cited References according to 37 CFR 1.132 by Robert M. Loomis, a co-inventor of the subject patent application. Applicants have now provided a third such Declaration from Mr. Loomis ("Loomis Declaration 3"). Mr. Loomis has been working in railroad tie rail restoration for more than 11 years for the assignee of the above-referenced patent application, the Willamette Valley Company ("WVC"). Mr. Loomis has also been working in restoring of damaged rail seats located on concrete rail ties for WVC for more than 6 years. The statements made herein and in prior Declarations by Mr. Loomis are based on his extensive real time technical experience, as well as his actual knowledge and know-how working for the WVC in railroad tie restoration technology. The Loomis Declaration 3 points out numerous incorrect statements as well as disparities regarding

the actual disclosures in the cited prior art and the Examiner's interpretation and analysis of the teachings of these references.

As stated in paragraph 17 of the Loomis Declaration 3, Mr. Loomis and the WVC have experimentally attempted to employ polyurethanes per se, such as the polyurethane material originally employed to form the concrete rail tie rail seat, to restore damaged rail seats on concrete rail ties to the original dimensions of the undamaged rail seat in the manner provided in claims 1-24. Mr. Loomis and the WVC have determined that such polyurethanes are not sag resistant and that they do not maintain their shape without substantial runoff from the concrete rail tie during said contouring and curing of the polymeric material as set forth in claims 1-24. Mr. Loomis and the WVC have also determined that polyurethanes, particularly the foamable polyurethanes of Giorgini and Rhodes, and polymeric materials of Markusch 1-3 and Barth, cannot be employed to restore a damaged rail seat since they are not solid and sag resistant and are not able to maintain their shape without substantial runoff from the concrete rail tie during the contouring and curing of the damaged rail seat according to the teachings of claim 1-24 of the subject patent application. The foam polyurethanes of Giorgini (without strength enhancers) and Rhodes, the non-sagging polyurethanes of Markusch 1-3, and the frothable polyurethanes of Barth do not have a modulus which is increased to a level which maintains the gauge of a rail assembly under dynamic operating conditions.

The Examiner has stated that Giorgini does not expressly teach : (1) restoring the damaged rail seat by curing the polymeric material under ambient temperature and pressure conditions; (2) wherein the polyurethane material is to be used to cure defects in rail seats and (3) wherein the polymeric material is substantially sag resistant assumedly during application, contouring and curing (sentence in Office Action is incomplete). As stated in paragraph 7 of the

Loomis Declaration 3, contrary to the Examiner's allegation, the wooden rail ties of Giorgini do not have rail seats located thereon. Rail seats are only present in the claimed concrete rail ties. The subject claims comprise applying a self-supporting poly (urethane-urea) to a damaged rail seat located on a concrete rail tie. The claimed concrete rail ties, contrary to the Examiner's allegation, do not include rail tie voids such as spike holes which are only present in wooden rail ties such as those in Giorgini. This is why, for example, the Examiner states that Giorgini teaches that a polyurethane foam mixture is applied to the rail tie void (defect) in a wooden rail tie. The void defect in Giorgini is within the confines of a wooden rail tie not on the top side or upper surface of a concrete rail tie in the manner which a rail seat is located on that concrete rail tie as set forth in claims 1-24. Repairing defects such as spike holes in wooden rail ties is a totally different technology than is restoring damaged rail seat located on concrete rail ties. Thus, there is no motivation to employ a self-supporting poly(urethane-urea) as per claims 1-24 since it is not needed for purposes of satisfying the method of Giorgini.

As stated in paragraph 8 of the Loomis Declaration 3, Giorgini teaches a polyurethane foam material comprising Part A which is a polyol component and part B which is an isocyanate component. The Giorgini foam material also can also include a polyamine "gelling agent". This gelled polyurethane is filled into a void defect in a wooden rail tie which surrounds and supports it in a manner described below so that the non-self-supporting foam of Giorgini doesn't sag or runoff because it is confined during the curing process. Clearly, contrary to the Examiner's allegations, the Giorgini foam polyurethane would runoff if it weren't supported within the structured boundaries surrounding the void defect. The polyurethane foam material supported within the confines of the void defect is then cured to repair the rail tie. The cured polyurethane foam is self-supporting only after it is cured but

not during the application and contouring processes. Again, Giorgini does not teach a method of restoring a rail seat on a concrete rail tie which differs substantially from repairing a wooden rail tie as described. Moreover, there is no motivation to employ a self-supporting solid poly(urethane-urea) as per claims 1-24 since it is not needed for purposes of satisfying the method of Giorgini in which a confining space is provided to support the Giorgini foam polyurethane during the curing thereof.

As stated in paragraph 9 of the Loomis Declaration 3, Giorgini adds a polyamine as a "gelling agent" to its polyurethane foam to form urea linkages and produce a modified polyurethane material. Even though this modified polyurethane foam material of Giorgini has urea linkages, contrary to the Examiner's allegations, it is not a solid poly (urethane-urea) material which can restore a rail seat on a concrete rail tie in the manner described in claims 1-24. The foamed modified polyurethanes to which an amine gelling agent have been added as described in Giorgini cannot be employed to restore a damaged rail seat since they are not self-supporting. So, the Giorgini polyurethane foam is not sag resistant and are not able to maintain its shape without substantial runoff from a concrete rail tie during the contouring and curing of the damaged rail seat. That is why the Giorgini polymeric materials is required to be located within a cavity having walls that surround and support it during the curing process in order for the Giorgini polyurethane foam to maintain its shape during curing. Again, there is no motivation to employ a solid self-supporting poly(urethane-urea) as per claims 1-24 since it is not needed for purposes of satisfying the method of Giorgini in which a confining space is provided to support the Giorgini foam polyurethane during the curing thereof.

As stated in paragraph 10 of the Loomis Declaration 3, the gelling agent's function in Giorgini is not to form the claimed solid self-supporting poly (urethane-urea) material as alleged by the Examiner. Its actual purpose is to prevent environmental water at the substrate/material interface from reacting with the isocyanate component which is contrary to the function of the claimed poly (urethane-urea) material. In formulating terms, the gelling agent is described as a surface-acting agent to provide a particular property or a desired surface effect. At the surface/material interface the polyamine reacts quickly to form a 'skin' or cured surface and prevents further isocyanate-water interaction by decreasing the diffusion rate of water by density of the material. This surface-acting effect is well known in foam formulations and in particular at the atmospheric material surface where amines, both polyamine and amine catalysts, form skins or very dense surfaces over a foam. So, the mere use of polyamines to thicken the material surface and prevent the isocyanate component from further reacting with environmental moisture does not change materially change the composition of the polyurethane foam material of Giorgini. Contrary to the Examiner's assertion, even though Giorgini foam forms "urea linkages" in its polyurethane composition it does not mean that Giorgini has formed a solid poly (urea-urethane) material, much less a solid poly (urea-urethane) material as described in pending claims 1-24 of the subject patent application.

As stated in paragraph 11 of the Loomis Declaration 3, in Giorgini, the claimed poly (urethane-urea) formulation actually creates a polyurea network throughout the material, not just an outer skin. This poly (urethane-urea) network prevents the material from sagging and flowing during contouring due to the presence of its three dimensional network structure. The claimed method is not directed to just a surface reaction as in Giorgini. The method as claimed

enhances the formation of a contoured damaged rail seat which has substantially the original dimension as an undamaged rail seat. In this way, the subject polyurethane-urea material can be dispensed on a surface without running off. Contrarily, the Giorgini material is not sag resistant, will not maintain its shape, but instead will simply roll off the surface while forming a surface skin as described above due to the presence of environmental water. Giorgini can only function within a confined space or cavity which retains and supports it until it can form a fully cured polyurethane rail hole plug because it does not have sufficient structural integrity as a stand-alone entitiy during the curing process. In Giorgini, the uncured foam polyurethane material is not sag resistant because it doesn't have to be sag resistant.

As stated in paragraph 12 of the Loomis Declaration 3, the claimed poly(urethane-urea) material is not a polyurethane foam composition such as described above by Giorgini. Polyurethanes, and particularly foamable polyurethanes, cannot be contoured and cured in an unsupported manner as described in claims 1-24. The Giorgini polyurethane foam materials are not sag resistant and they cannot maintain their shape without substantial runoff as per our claimed poly(urethane-urea) material which do not substantially runoff from a concrete rail tie during the contouring and curing process steps. The contouring function is present in the claimed method because applicants have determined that this step is needed using a self-supporting solid poly (urethane-urea) material in order to satisfactorily conduct a damaged rail seat restoration on a concrete rail tie not in a confined space as taught by all the prior art references cited in the subject rejection.

As stated in paragraph 13 of the Loomis Declaration 3, the Examiner asserts that a sag resistant polymeric repaired article is produced by Giorgini which can withstand dynamic operating conditions, compressive loading, maintaining rail gauge of a railcar. The sag

resistance property is only present in the Giorgini post cured repaired article not during application or curing. Moreover, Giorgini doesn't include a contouring step because it isn't required because of the presence of cavities in the wooden rail tie which support the polyurethane material during curing. Furthermore, the sag resistance post cured repaired article requires strength enhancers in order for it to withstand dynamic operating conditions, compressive loading, and maintain the rail gauge of a railcar. Applicants do not use strength enhancers for restoring a damaged rail seat located on a concrete rail tie.

As stated in paragraph 14 of the Loomis Declaration 3, Giorgini provides that foam polyurethane materials containing strength enhancers can repair defects which create "cavities" in structural members such as wooden rail ties, doors, windows, furniture, and cabinets, and in cavities formed within concrete structures. These cavities are void areas in structural members which can be filled with the polyurethane foam material of Giorgini and which must have the ability to surround and support the polyurethane foam material during the curing process. Contouring of a polymeric material does not occur in the repair process of Giorgini because it is not necessary to do so. The polyurethane foam material of Giorgini must be surrounded and supported by the walls of the cavity into which it have been introduced during the curing process. Sag resistance and runoff are not a problem in the repair operation of Giorgini because these situations do not arise when a foam polymeric material is put into an enclosure which supports it during the entire curing step.

As stated in paragraph 15 of the Loomis Declaration 3, conventional rail seats used on concrete rail ties are made of a polyurethane material which is not the poly(urethane-urea) material of claims 1-24. As described above, applicants have determined that this conventional polyurethane material is not sag resistant and, if applied to a damaged rail seat, will runoff during

any one of the application, contouring and curing steps which are set forth in claims 1-24. The teachings of Giorgini are also not applicable to the repair of rail seats located on concrete rail because, as described above, Giorgini relates to wooden rail ties which do not include polyurethane rail seats. The Giorgini process does not contemplate repairing rail seats on concrete rail ties.

With respect to claims 1, 11, and 21 the Examiner admits that Giorgini does not expressly teach : (1) restoring the damaged rail seat by curing the polymeric material under ambient temperature and pressure conditions; (2) wherein the polyurethane material is to be used to cure defects in rail seats and (3) wherein the polymeric material is substantially sag resistant prior to application. Rhodes is then cited by the Examiner for purposes of addressing the absence of relating to the absence of teaching (1)-(3) as described above.

As stated in paragraph 16 of the Loomis Declaration 3, Rhodes teaches a method of repairing spike holes in a wooden railway tie which is similar to Giorgini. However, both Rhodes and Giorgini are both totally different than the method of restoring a damaged rail tie which is set forth in claims 1-24. According to both Giorgini and Rhodes, a polyurethane foam, not a solid poly (urethane-urea) material, is introduced into a spike hole in a wooden rail tie which acts as a mold for the formation of the cured polymeric material and is different than claim 1-24 for the reasons set forth above. The repaired articles formed from the processes disclosed in Giorgini and Rhodes do not have the claimed sag resistance nor the ability to maintain its shape without substantial run-off during application and curing and is different than claim 1-24 for the reasons set forth above.

Contouring of the polyurethane material of Rhodes is not taught or suggested because

it is not contemplated in order to accomplish the purposes stated in Rhodes which are quite different than claims 1-24 for the reasons set forth above. Rhodes can only undergo curing within a confined space or cavity which retains and supports it until it forms a fully cured polyurethane rail hole plug. Rhodes does not have sufficient structural integrity as a stand-alone entity during the application or curing process. So, the problems described above with respect to Giorgini are also attributable to Rhodes as well.

The Examiner admits that the combination of Giorgini and Rhodes do not expressly teach wherein the polyurethane material is to be used to cure defects in rail seats. However, the Examiner posits that Young discloses that rail tie assemblies and rail seats need to be restored to original specifications. As stated in paragraph 18 of the Loomis Declaration 3, Young employs a method of curing defects in rail seats which is totally different than the method of claim 1-24.

Young involves the use of epoxy materials which cure slowly. Young's requires using confining equipment such as a clamp system for confining the epoxy material during curing. In the Young method heat and pressure are applied to the confined epoxy material. Young is similar to Giorgini and Rhodes in that it relates to the application and curing of a non-self-supporting polymeric material which must be conducted in a confined space. Furthermore, Young requires the use of heat and pressure to cure the epoxy material. However, the method of claims 1-24 employs a poly(urethane-urea) material, not a foam polyurethane or epoxy, which is self-supporting and does not require confining equipment or a confining cavity (see discussion above re Giorgini and Rhodes), nor does it need to employ heat or pressure. Even when the epoxy is applied in a relatively thin layer, the cure time can take 12 to 36 hours at typical ambient temperatures. This is completely unacceptable from a train operator's point of view. If trains are running even relatively slowly over the freshly

repaired rail seats, and if the epoxy is still in a plastic state, it will run-off. This will disrupt the true level of the rail seat, causing cavities to form in the rail seat material. This also results in improper bonding to the abrasion plate. All of these factors will lead to subsequent failure of the rail seat. Claims 1-24 define technology which is a substantial improvement over Young for the following reasons: 1) there is no confinement equipment which is required; 2) there is no pressure which is required; 3) there is no heat which is required; and 4) the claimed poly(urethane-urea) material meets the requirements which are not met by epoxy materials such as being self-supporting and capable of being contoured and cured without being confined. The claimed poly(urethane-urea) also exhibits the following improved properties: (a) excellent durability, strength, and adhesion, (b) minimum gel time, and (c) excellent compressive loading, elongation, and ease of application.

As stated in paragraph 19 of the Loomis Declaration 3, rail seat abrasion is a major problem with respect to concrete rail ties, but contrary to the Examiner's allegations, it is not a problem re wooden rail ties. It is only a major safety and maintenance problem for railroad companies who employ concrete rail ties. The claimed method successfully commercially overcomes the rail seat abrasion problem without incurring the problems associated with the use of epoxies. Young relates to the use of epoxy to repair concrete rail seats. For example, our poly(urethane urea) material cures more quickly, does not require the use of rail holding plates, is extremely tough and is not brittle. A further discussion of the problems which result from the use of epoxies for repairing rail seat abrasion can be found in the above-referenced patent application from page 2, line 18 to page 3, line 6.

The Examiner admits that Giorgini does not expressly teach wherein the polymeric material is substantially sag resistant prior to application. However, Barth, Markuschl ,

Markusch2, and Markusch3 are cited they supposedly teach that when repairing defects in an article (concrete or plastic) a non-sagging (sag resistant) material (polyurethane based) is used which can be cured at ambient conditions. As provided in paragraph 20 of the Loomis Declaration 3, this statement by the Examiner is not correct. Markusch 1-3 ("Markusch") relates to an expandable material that is non-shrinking, not a substantially sag resistant solid poly (urethane-urea) material which can be employed for restoring a damaged rail seat located on a concrete rail tie. The Markusch material is expandable and non-shrinking within a confined area (the same as Giorgini, Rhodes and Young) not a non-expanded, unsupported, unconfined solid material which can be contoured and cured in situ according to claims 1-24. The polyurethane material of Markusch is actually a non-shrinking composition which employs water as a non-shrinking agent. The Markusch material expands and fills a cavity (as does Giorgini and Rhodes) and, because it including a non-shrinking agent (water), it will fill the cavity into which it is introduced and will not contract within that cavity. The Markusch material is an expanded polyurethane which will not support and maintain the gauge of a rail assembly under dynamic operating conditions. It is clear that the term sag resistant as used in claims 1-24 is totally different from the non-shrinking polyurethane materials of Markusch 1-3. More specifically, in claims 1-24, the contoured damaged rail seat which is substantially sag resistant maintains its solid shape without substantial runoff from the concrete rail tie during the contouring of the uncured polymeric material.

The Examiner states that Barth teaches that when repairing defects in an article (concrete or plastic) a non-sagging (sag resistant) material (polyurethane based) is used which can be cured at ambient conditions. As provided in paragraph 21 of the Loomis Declaration 3, this statement by the Examiner is not correct. Barth is an expandable frothable cellular polyurethane material

that is non-shrinking, not the claimed substantially sag resistant solid poly (urethane-urea) material which can be employed for restoring a damaged rail seat located on a concrete rail tie. The Barth material is expandable and non-shrinking within a confined area not a non-expanded, unsupported, unconfined solid material which contoured and cured in situ according to claims 1-24. The polyurethane material of Barth is really a non-shrinking composition which employs inert gas as a non-shrinking agent. The Barth material expands and fills a cavity (as does Giorgini and Rhodes) and, because it including a non-shrinking agent (inert gas), it will fill the cavity into which it is introduced and will not contract within that cavity. The Barth material is an expanded cellular polyurethane and would not form a solid rail seat which will not support and maintain the gauge of a rail assembly under dynamic operating conditions.

As stated by the Examiner, regarding claims 2-3 and 12-13, Giorgini does not teach: (1) wherein the damage rail seat is restored without requiring the use of non-ambient heat and (2) wherein the damage rail seat is restored without requiring the use of non-ambient pressure. Rhodes is not applicable to claims 2-3 and 12-13 for the reasons set forth above.

As stated by the Examiner, regarding claims 4-5 and 14-15, Giorgini teaches wherein the polyurethane composition has a gel time that can be less than 5 seconds. (See column 3 lines 35-41. Giorgini is not applicable to claims 4-5 and 14-15 for the reasons set forth above.

As stated by the Examiner, regarding claims 6 and 16, Giorgini does not explicitly teach wherein the Set Time of the polymeric material is sufficient for contouring the restored rail seat in situ without requiring the use of non-ambient heat. Rhodes is not applicable to claims 6 and 16 for the reasons set forth above.

As stated by the Examiner, regarding claims 7-10 and 17-20, the combination of Giorgini and Rhodes do not expressly teach: (1) wherein the rail ties having the restored rail seat

maintains the gauge of a rail assembly under dynamic operating conditions; (2) wherein the modulus of the restored rail seat is increased to a level which will resist compressive loading and maintain the rail gauge of the rail assembly; (3) wherein the Elongation of the restored rail seat is at least about 10%; and (4) wherein the Shore D (24 hour) Hardness of the restored rail seat is at least about 65. Rhodes and Giorgini are not applicable to claims 7-10 and 17-20 for the reasons set forth above.

Regarding the rejections described above, if a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. *See In re Fritch*, 972 F.2d at 1265 n.12 ("A proposed modification [is] inappropriate for an obviousness inquiry when the modification render[s] the prior art reference inoperable for its intended purpose."). Therefore, the rejection of claims 1-21 is clearly erroneous for the reasons set forth above.

Regarding the rejections described above, "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 353 F.2d 238, 241 (CCPA 1965); see also Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 448-49 (Fed. Cir. 1986). Therefore, claims 1-21 are allowable.

Claims 22-24 are rejected under 35 USC 103(a) as being unpatentable over Giorgini, in view of Rhodes, as evidenced by Young, in further view of Barth, or Markusch1 or Markusch 2 or Markusch3, in further view of AZOM (Polyurethanes – What Goes into Pu, pages 1-6 (2003).

Applicants traverse the above rejection based on Giorgini, Rhodes, Young, Barth and Markusch 1-3 for the reasons set forth in prior responses and for the reasons set forth above. Applicants traverse the above rejection based on AZOM for the reasons set forth below.

The Examiner defines chain extenders as reactive low molecular weight di-functional compounds such as hydroxyl amines, glycols or diamines which are used to influence the end properties of polyurethane. As stated in paragraph 22 of the Loomis Declaration 3, the use of chain extenders will not create the sag resistant properties in the cure time of our technology as set forth in claims 1-24. The claimed product doesn't use chain extenders to create its excellent sag resistant characteristics.

Regarding the rejections described above, if a proposal for modifying the prior art in an effort to attain the claimed invention causes the art to become inoperable or destroys its intended function, then the requisite motivation to make the modification would not have existed. *See In re Fritch*, 972 F.2d at 1265 n.12 ("A proposed modification [is] inappropriate for an obviousness inquiry when the modification render[s] the prior art reference inoperable for its intended purpose."). Therefore, the rejection of claims 22-24 is clearly erroneous for the reasons set forth above.

Regarding the rejections described above, "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 353 F.2d 238, 241 (CCPA 1965); see also Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 448-49 (Fed. Cir. 1986). Therefore, claims 22-24 are allowable.

No new matter has been added by this amendment. Allowance of all claims is requested. The Examiner is requested to call the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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